water was turned eastward through the narrow defiles across the Luzerne range to Glens Falls, where it found its present channel to the south.

2. The gravel deposits bordering the river east of the Luzerne range, and extending to Sandy Hill, are a true delta deposit of the Hudson when swollen by the torrents accompanying the melting of the ice over the Adirondack region during the last stages of the glacial period. The limitation of the amount of debris and the brevity of the period appear in the fact that the channel between Fort Ann and Fort Edward was not filled by gravel.

3. The gravel deposits extending through Saratoga county were made at an earlier stage of the recession, when ice occupied not only the region to the north, but the eastern part of the Hudson Valley to a considerable distance farther south. This view is supported not only by the line of eskers referred to, but by the fact that throughout this region the glacial striæ are from northeast to southwest. These are very pronounced in the vicinity of Saratoga Springs and at Fort Ann. It would seem that the retreat of the ice was from the southwest, and that the area about the mouth of the Mohawk was earlier free from ice than were the flanks of the Green Mountains north of Troy; so that during the closing stages the line of resistance for the movement of ice was diagonally across the Hudson toward the area just south of the Kayadarosseras Mountains.

4. The main line of the Champlain Valley extends southward through South Bay, while the main line of the Lake George Valley extends southward through Dunham Bay to the Hudson.

5. The subsidence of the Champlain epoch, which amounted to about 300 feet in the vicinity of Ticonderoga, was probably not much less in the vicinity of Fort Edward; for it seems evident that the delta of the Hudson River, which came down at Sandy Hill to the border of the Fort Edward-Fort Ann channel, must there have met still water nearly up to its level of 300 feet. The deposits of sand were sharply limited by deep water, while the clay had ample opportunity to settle over all the areas along the Hudson up to a height of from 200 to 250 feet above tide.

6. There is nothing in this region which indicates a post-glacial depression of more than 300 feet, but everything to indicate the opposite. All the gravel deposits above that level are of the nature of eskers and kames.

7. The preglacial watershed between the St. Lawrence and the Hudson was probably near the middle of Lake George and at Fort Ann.

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Oberlin, O.

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*THE EARLY SEGREGATION OF FRESH-WATER TYPES.**

Dr. Gill prefaced his communication with the statement that it was a familiar fact that some of the most primitive types of animals were represented in the fresh-waters and in them only; this is especially the case with true fishes. It is also well known that fresh-water animals show all degrees of relationship to salt-water forms, ranging from species that are anadromous or catadromous to those that are representatives of families or groups of families confined to the fresh water. But it has not been appreciated how radically a large proportion of the fresh-water fauna has been differentiated from the marine. The perception of the extent of this differentiation has been delayed by the false taxonomic principles that have long prevailed. A typical instance of the truth of this proposition is furnished by the Ostariophysial

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fishes. This great group includes nearly two-thirds of all fresh-water fishes and comprises the Characinids of America and Africa, the Gymnotids of America, the Cyprinids of the northern hemisphere and the various families of Nematognaths. These groups, in most systematic works, have been widely separated and severally associated with forms with which they have no intimate relationships. As long as such views prevailed, the appreciation of the great importance of the geographical distribution of the groups was concealed from view. But with the recognition of the unity of organization, and, consequently, unity of origin of the whole, a fresh conception of the relations of that whole to the faunas of the present and past breaks in upon us. We are now justified, from the morphological data at hand, in claiming that all the groups enumerated as OSTARIOPHYSI and belonging to the orders PLECTOSPONDYLI and NEMATOGNATHI are naturally segregated and not closely related to any existing aboriginal marine types. The marine forms of the family *Plotosidæ* and the siluroid sub-family *Tachisurinæ* must be regarded as divergents from fresh-water forms. With this assumption it becomes necessary to postulate that all the numerous families of the Plectospondylous and Nematognathous orders are derivatives from primitive fresh-water types. The extent of this divergence may be inferred from the numerous morphological modifications. The antiquity of the origin of the superorder must be commensurate with the extent of divergence. Far from originating in the advanced tertiary, it is not unreasonable to infer that the parent stock had become acclimatized in the fresh water as far back as the early mesozoic; instead of the parent land being the Himalaya region or highlands of Asia, as claimed by Dr. Günther, it is much more likely to have been in the southern hemisphere—possibly an antarctic continent. At any rate, the present geographical distribution of the representatives of the respective orders seems to render such an origin most probable. The reasons were given in detail.

The distribution of the group thus outlined is to some extent collateral with that of certain mollusks and crustaceans, and the facts respecting the range of the unionaceous bivalves and the ostracod crustaceans were especially discussed.

It is quite true that there is no paleontological evidence for the inferences and assumptions thus made, but this is simply because the geological record is wofully imperfect and many of the changes took place in continental areas now submerged or little explored. No remains of Ceratodontids, which must of course have lived to continue the line from the Jurassic species to the present, have been found. The same conditions that have affected the one must have prevailed for the others.

DRY DREDGING IN THE MISSISSIPPIAN SEA.

THE U. S. National Museum has recently secured large collections of Devonian fossils, chiefly corals, from New York, Ontario and Michigan. The first casts were made in the Corniferous limestone in the vicinity of LeRoy, New York, where the cherty limestone underlying the quarry layers is charged with an abundance of corals, the net sometimes having masses of *Diphyphyllum* of more than a hundred pounds weight. At Williamsville, near Buffalo, corals are also plentiful, but here the fauna is smaller and the species are not so common as at LeRoy. However, a short distance west of Buffalo, to the north and west of Port Colborne, in Ontario, well-preserved Corniferous corals are present in great variety and abundance. Also at Hagersville, large masses of various compound species are numerous, many hundred tons of which, two years ago, were broken up